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ternate leaves was $\frac{8}{29}$, falling into the series $\frac{1}{3}$, $\frac{1}{4}$, $\frac{2}{7}$, $\frac{3}{11}$, $\frac{5}{18}$, $\frac{8}{29}$, etc. In a few cones with opposite scales it was $\frac{10}{26}$, falling into a series given above. In a few others in whorls of three the fraction was $\frac{6}{15}$; in one cone the scales were in whorls of four. How many additional forms may be found on examining large numbers of specimens he did not know, but presumed we had not yet found them all. On all the trees examined, he had found the spiral whorls of the scales to vary; that certain spirals ran to the right in part of the cones, and to the left in about the same number on each tree in each year; that in all cases examined there was quite a variety in the phyllotaxis of each tree. So he had found it on many herbaceous plants.

As we might expect, there was no one, fixed, undeviating plan for the arrangement of all the leaves on plants of any species; we should find exceptions to our rules if we examine specimens enough.

BOTANICAL NOTES FROM RECENT PERIODICALS.—*Flora.* (No new numbers have been received since our last review.)

Botanische Zeitung, No. 43. O. Behrendsen, Contributions to the Flora of Hungary. No. 44. E. Stahl, On the Artificial Formation of Protonemata from the Sporogonium of Musci. (In true mosses the protonema is a tubular outgrowth from the spore. This minute tube elongates by growth at the tip, and afterwards branches. Pringsheim has shown (1876) that protonematous threads may be produced from the severed fruit-stalk of mosses. This is now confirmed by Stahl, who also shows its bearing upon alternation of generation, and examines its relations to Dr. Farlow's interesting discovery of an asexual growth on the prothallus of ferns.) Cramer, Note claiming Priority of Discovery respecting Reproduction in *Ulothrix.* Reports of Societies. Nos. 45 and 46 previously noticed. No. 47. Fickel, On the Anatomy and Development of the Seed-Coats of some *Cucurbitaceæ.* Continued in Nos. 48, 49, and 50. No. 51. Dr. Drude, On the Separation of the Palms of America from those of the Old World.

ZOÖLOGY.

A NEW SUB-KINGDOM OF ANIMALS.—Prof. E. Van Beneden in his elaborate "Recherches sur les Dicyemides, Survivants actuels d'un Embranchement des Mésozoaires" proposes a new sub-kingdom of animals. In 1830 Krohn observed the presence in the liquid bathing the spongy bodies (perhaps renal organs) of different species of Cephalopods certain filiform bodies, covered with vibratile cilia and resembling infusoria or ciliated worms. They were called *Dicyema* by Kölliker, who, with others, considered them as intestinal worms; Van Beneden claims that they have no general body-cavity. The body is formed (1) of a large axial cylindrical or fusiform cell, which extends from the anterior extremity of the body, enlarged into a head, to the caudal extremity; (2) of a single row of flat cells forming around the axial cell a sort of simple pavement epithelium. All these cells are placed in juxtaposition like the constituent elements of a vegetable tissue. There is no trace of a homogeneous layer, of connective tissue, of muscular fibre, of nervous elements, nor of intercellular substance. There is only between the cells a homogeneous (*unissante*) substance, as between epithelial cells. The axial cell is regarded as homologous with the endoderm of the higher animals (*Metazoa*). He designates as the ectodermic layer the cells surrounding the large, single axial cell. There exists no trace of a middle layer of cells. We discover no differentiated apparatus; all the animal and vegetative functions are accomplished by the activity of the ectodermic cells and of the axial cell. On account of these characteristics Van Beneden regards these organisms as forming the type of a new branch of the animal kingdom which he distinguishes as *Mesozoa.*

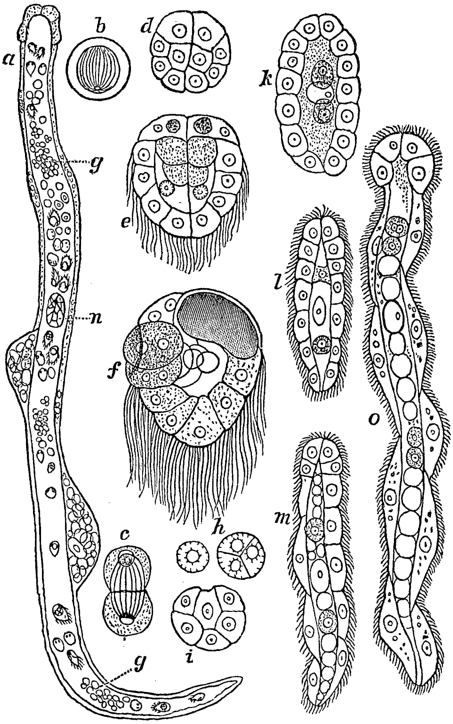
Each species of *Dicyema* comprises two sorts of individuals differing externally, one (the *Nematogene*) producing vermiform embryos, the other (*Rhombogene*) infusoriform young. The Nematogenes produce germs which undergo total segmentation, and assume a *gastrula* condition. After the closure of the blastopore the body elongates, and the worm-like form of the adult is finally attained, as they pass through the body-walls of the parent.

The germs of the Rhombogenes arise endogenously in special cells lodged in the axial cell and called "germigenes." The germ-like cells undergo segmentation, and then form small spheres which become infusoriform embryos. The worm-like young is destined to be developed and live in the Cephalopod where it has been born, while the infusorian-like young probably performs the office of disseminating the species; it transmits the parasite of one Cephalopod to another.

This work is also an important contribution to histology, particularly to the subject of cell-division. Says Van Beneden, "the recent researches of Auerbach, of Bütschli, of Strasburger, of Hertwich, and those that I have published, have established the fact that the division of a cellule, that is to say, the multiplication of the cellular individuality, is the resultant of a long series of complex phenomena, accomplished in a determinate order, and having their seat as much in the nucleus as in the substance of the cell."

Finally, Van Beneden places in his branch of *Mesozoa* the hypothetical *Gastræades*, which term he applies to (*gastrula*-like) organisms formed of two kinds of cellules, some ectodermic, others endodermic, in which the endoderm is formed by invagination. He calls *Planulades*, those hypothetical Mesozoa which are formed from a many-celled sphere constituted like a *Magosphæra* (Haeckel) and in which the two cellular layers are developed by delamination. He therefore divides the animal kingdom into three primary groups, that is, the *Protozoa*, the *Mesozoa*, and the *Metazoa.*

Our illustration will convey some idea of these organisms. Fig. *a* represents *Dicyemella wageneri; g*, germigenes; *n*, the nucleus of the axial cell; *b*, the spherical germ of *Dicyemella* with its striated nucleus;



(Fig. 24.) DICYEMELLA AND YOUNG.

c, the same beginning to undergo self-division; *d*, final stages of self-division (morula); *e* and *f*, infusoriform embryo; *h*, germs of the vermiform embryos of *Dicyema typus; i*, gastrula of the same; *k, l, m, o*, different stages of vermiform larvæ of *Dicyema typus.*

ANTHROPOLOGY.

Archæological Exchange Club. — A want which American anthropologists have long felt is about to be supplied in the formation ot the "Archæological Exchange Club." in connection with the "American Anthropological Association." The conditions of membership are given in a circular to be obtained from Stephen D. Peet, Secretary, Ashtabula, Ohio. The advantages to be derived by members are twofold: first, they will have their papers laid before every prominent archæologist in the country; secondly, they will be supplied with many publications which could be obtained in no other way. It is to be hoped that each one interested in this branch of science will assist in the establishment of the club by becoming a member. The benefits occurring from such